

What is claimed is:

1. An electronic device comprising:
a substrate having at least one build up layer,
a semiconductor die, and
at least one interconnect disposed between the substrate and the semiconductor die,
wherein the substrate is bonded with the semiconductor die by the at least one interconnect,
wherein the at least one build up layer comprises at least one binder and at least one filler, and
wherein the at least one filler has a negative coefficient of thermal expansion.
2. The electronic device of claim 1, wherein the at least one filler comprises zirconium tungstate.
3. The electronic device of claim 2, wherein the zirconium tungstate is a crystalline compound having a nearly isotropic coefficient of thermal expansion of approximately -4.9ppm/degree C or less over at least the temperature range of -50 degrees C to +250 degrees C.
4. A substrate for use in an electronic device, comprising:
a core,
at least one conductive layer,
at least one build up layer having at least one binder and at least one filler,

wherein the at least one filler has a negative coefficient of thermal expansion.

5. The substrate of claim 4, wherein the at least one filler comprises zirconium tungstate.
6. The substrate of claim 5, wherein the zirconium tungstate is a crystalline compound having a nearly isotropic coefficient of thermal expansion of approximately -4.9ppm/degree C or less over at least the temperature range of -50 degrees C to +250 degrees C.
7. A material for use as a build up dielectric layer for a substrate, comprising:
at least one binder, and
at least one filler,
wherein the at least one filler has a negative coefficient of thermal expansion.
8. The material of claim 7, wherein the at least one filler comprises zirconium tungstate.
9. The material of claim 8, wherein the zirconium tungstate is a crystalline compound having a nearly isotropic coefficient of thermal expansion of approximately -4.9ppm/degree C or less over the temperature range of -50 degrees C to +250 degrees C.
10. An electronic device comprising:
a semiconductor die,
a next level package,

at least one interconnect disposed between the semiconductor die and the next level package, and

an underfill disposed at least in part between the semiconductor die and the next level package,

wherein the semiconductor die is bonded with the next level package by the at least one interconnect,

wherein the semiconductor die is bonded with the next level package by the underfill,

wherein the underfill comprises at least one binder and at least one filler, and

wherein the at least one filler has a negative coefficient of thermal expansion.

11. The electronic device of claim 10, wherein the at least one filler comprises zirconium tungstate.

12. The electronic device of claim 11, wherein the underfill is a no-flow underfill.

13. The electronic device of claim 11, wherein the zirconium tungstate is a crystalline compound having a nearly isotropic coefficient of thermal expansion of approximately -4.9ppm/degree C or less over the temperature range of -50 degrees C to +250 degrees C.

14. A method of bonding a semiconductor die with a next level package, comprising:

providing at least one interconnect;

providing an underfill material having at least one binder and at least one filler, the at least one filler having a negative coefficient of thermal expansion;

arranging the semiconductor die, the next level package, the at least one interconnect and the underfill material such that the at least one interconnect is disposed so as to be capable of joining the semiconductor die with the next level package and such that the underfill material is disposed at least in part between the semiconductor die and the next level package;

causing the at least one interconnect to bond the semiconductor die with the next level package; and

causing the underfill material to bond the semiconductor die with the next level package.

15. The method of claim 14, wherein the at least one filler comprises zirconium tungstate.

16. The method of claim 15, wherein the zirconium tungstate is a crystalline compound having a nearly isotropic coefficient of thermal expansion of approximately -4.9ppm/degree C or less over the temperature range of -50 degrees C to +250 degrees C.

17. An electronic system comprising:

an electronic device having a substrate, the substrate having at least one build up layer and at least one conductive layer,

wherein the build up layer comprises at least one binder and at least one filler, and

wherein the at least one filler has a negative coefficient of thermal expansion.

18. The electronic system of claim 17, wherein the at least one filler comprises zirconium tungstate.

19. The electronic system of claim 18, wherein the zirconium tungstate is a crystalline compound having a nearly isotropic coefficient of thermal expansion of approximately -4.9ppm/degree C or less over the temperature range of -50 degrees C to +250 degrees C.

20. An electronic system comprising:

an electronic device having a semiconductor die bonded with a next level package by an underfill disposed at least in part between the semiconductor die and the next level package,

wherein the underfill comprises at least one binder and at least one filler,
wherein the at least one filler comprises crystalline zirconium tungstate having a nearly isotropic coefficient of thermal expansion of approximately -4.9ppm/degree C or less over the temperature range of -50 degrees C to +250 degrees C.